XII.—*George Mercer Dawson.*

By B. J. HARRINGTON.

(Read May 26, 1902.)

Twenty years have elapsed since the inauguration of the Royal Society of Canada, and in that time many of those who were wont to gather with us have been called to the majority. Sir William Dawson, our first President, died in 1899, ripe in knowledge and in years, but no one then thought that he would so soon be followed by his distinguished son, Dr. G. M. Dawson. To the latter, years of usefulness and honour seemed to remain; but how little do we know of what lies before us! Life is ever uncertain, and Dr. Dawson realized this when he wrote:

"Life is a bubble on the sea,
The ocean of eternity;
It floats awhile in glittering pride,
It may o'er many billows ride.
There comes a moment, none knows why,
No cloud o'erspreads the summer sky,
Some little breath, some hidden thing,
Perhaps a spirit on the wing,
Touches the orb — it melts away,
The sea receives its little spray; —
No mark, no memory left behind.
The everlasting sea, the wind — flow on."

Dr. Dawson was the second son of the late Sir J. W. Dawson, and was born on the 1st of August, 1849, in Pictou, Nova Scotia. In 1855 his father, who had for some years been acting as Superintendent of Education for Nova Scotia, received the appointment of Principal of McGill University, Montreal, and with his family took up his residence there. Instead of the magnificent structures of to-day, there were then on the college grounds only two "unfinished and partly ruinous buildings, standing amid a wilderness of excavators' and masons' rubbish, overgrown with weeds and bushes. The grounds were unfenced and pastured at will by herds of cattle, which not only cropped the grass, but browsed on the shrubs, leaving unhurt only one great elm, which still stands as the 'founder's tree,' and a few old oaks and butternut trees"[1]. Surroundings of this kind were not ideal from a university point of view, but made an instructive environment for an intelligent boy. The numerous wild flowers, the birds' nests, the fossil

[1] Fifty Years of Work in Canada — Autobiographical Notes by Sir William Dawson, p. 98.

shells in the blue clay, the waste waterway, where leaves and twigs became "petrifactions," the lively brook where mimic fleets could be navigated and dams constructed—these and many other objects of interest were there, and with the guidance and encouragement of an ever-ready father, the boy's inborn love of nature was daily stimulated and increased.

At ten years of age Dawson entered the Montreal High School, remaining there for one year and taking a high place in his classes. Subsequently, however, owing to ill-health, his education was carried on for the most part under tutors; and while this system, no doubt, cut him off from some advantages, it gave him on the other hand wider opportunities for pursuing and mastering subjects which had special attractions for him. Surrounded by books, chemical apparatus, paints and pencils, the days were never too long, and photography, book-binding, painting magic lantern slides, and even cheese-making, afforded him fascinating occupation and amusement. One who knew him well at that time says: "He seemed to absorb knowledge rather than to study, and every new fact or idea acquired was at once put into its place and proper relations in his orderly mind. He was always cheerful, amusing and popular, other boys flocking around him and invariably submitting to his unconscious leadership."

At the age of eighteen, Dawson entered McGill College as a partial student, attending lectures on English, Chemistry, Geology, &c., during the session of 1868-9. The summer of 1869 was spent at Gaspé and much time devoted to dredging for foraminifera, which with material from other sources formed the basis of his first scientific paper, published in the Canadian Naturalist in 1870, and in the Annals and Magazine of Natural History of the following year. While a student at McGill he wrote a poem on Jacques Cartier which, though but a boyish effort was thought very well of by his instructors and gives evidence of his keen love of nature and poetic instinct. The scene on the summit of Mount Royal, whither Cartier was conducted by the red men of Hochelaga, is thus described:

> "Far on the western river lay,
> Like molten gold, the dying day.
> Far to the east the waters glide
> Till lost in twilight's swelling tide;
> While all around, on either hand,
> Spread the broad, silent, tree-clad land;
> And in the distance far and blue
> Long swelling mountains close the view."

In 1870 Dawson went to London and entered the Royal School of Mines, at that time on Jermyn street. He was fond of the sea, and on

this occasion made the passage in a sailing ship, he and another young man being the only passengers. During the voyage he amused himself making observations on the surface life of the ocean, and the phenomena of phosphorescence. He also studied navigation under the captain, and the knowledge then acquired afterwards stood him in good stead when he had to navigate a schooner along the dangerous coasts of British Columbia and the Queen Charlotte Islands.

At the School of Mines he took the full course of study, extending over three years, and passed as an associate. At the end of his second year, he carried off the Duke of Cornwall's scholarship, given by the Prince of Wales, and on graduation stood first in his class, obtaining the Edward Forbes Medal and Prize in Palæontology and Natural History, and the Murchison Medal in Geology. During his course he paid special attention to the study of geology under Ramsay, Huxley and Etheridge, but also devoted much time to chemistry and metallurgy, under Frankland and Percy respectively, and to mining under Warrington Smyth. Even in his holidays he was never altogether idle, and during most of the summer of 1871 he was attached to the British Geological Survey, and worked with the late J. Clifton Ward in the Cumberland Lake-District. While in England he made many warm friends, with some of whom he corresponded regularly for years afterwards.

On returning to Canada in 1872, he was engaged for some months examining and reporting upon mineral properties in Nova Scotia, and subsequently went to Quebec, where he delivered a course of lectures on chemistry at Morrin College, which was attended by a large and appreciative class. In 1873 he was appointed Geologist and Botanist to Her Majesty's North American Boundary Commission, which had been constituted to fix the boundary line between British North America and the United States, from the Lake of the Woods to the Rocky Mountains, and which had been carrying on its labours for about a year. From early boyhood Dawson had been keenly interested in travel and exploration, and in the Canadian Northwest he saw a region ready to yield up a rich harvest of discovery. There was the charm of novelty afforded by a well-nigh untrodden field, and the many hardships to be encountered only seemed to lend attractions to the expedition. In those days no Canadian Pacific trains rolled across the continent. Fort Garry, now the fast-growing city of Winnipeg, with more than 40,000 inhabitants, was then practically the last outpost of civilization, and the great prairies had to be traversed on horseback or on foot, provisions and equipment of every kind being carried in Red River carts, drawn by oxen or ponies with shaganappy harness. The two years of Dawson's connection with the Boundary Commission were for

him years of incessant activity, but the results of his work were of great scientific value. They were embodied in a report addressed to the head of the Commission, Major (now General) D. R. Cameron, R.A., and published in Montreal in 1875.[1] The volume, which is now looked upon as "one of the classics of Canadian geology," is a model of what such reports should be—scientific facts being clearly and succinctly stated and the conclusions logically drawn. The main geological result arrived at was the examination and description of a section over 800 miles in length across the central region of the continent, which had been previously touched upon at a few points only, and in the vicinity of which a space of over 300 miles in longitude had remained even geographically unknown. The report discussed not merely the physical and general geology of the region, and the more detailed characteristics of the various geological formations, but also the capabilities of the country with reference to settlement. The whole edition was long ago distributed, and the volume is now exceedingly scarce and difficult to obtain. While attached to the Boundary Commission, Dawson made large collections of natural history specimens, which were forwarded to England and found a home in the British Museum, as well as at Kew and elsewhere. The British Museum obtained no less than seventeen species of mammals not previously represented in its collections.

More or less in connection with the above work were published papers on the "Lignite Formations of the West," the "Occurrence of Foraminifera, Coccoliths, etc., in the Cretaceous Rocks of Manitoba," on "Some Canadian Species of Spongillæ," on the "Superficial Geology of the Central Region of North America," on the "Locust Invasion of 1874 in Manitoba and the Northwest Territories," etc.

When the work of the Boundary Commission was brought to a close, Dawson received an appointment on the staff of the Geological Survey of Canada and began in that connection the long series of explorations of the Northwest and British Columbia, which brought such great credit to himself and his country. In 1883 he was made an Assistant Director of the Survey, and later, on the retirement of Dr. Selwyn, in 1895, became head of the department, a position which he occupied until the time of his death on the 2nd of March, 1901. Throughout his connection with the Survey his reports were always of a high order, bearing evidence of his striking powers of observation and deduction. Though thoroughly scientific, they always took account of the practical and economic side of geology, and accordingly com-

[1] Report on the Geology and Resources of the Region in the vicinity of the Forty-ninth Parallel, from the Lake of the Woods to the Rocky Mountains, with Lists of Plants and Animals collected and Notes on the Fossils.

manded the attention and confidence of mining capitalists, mine managers and others interested in the development of the mineral resources of the country. When in the field, geology was, of course, the principal object of his investigations, but his wide knowledge of collateral sciences enabled him not merely to collect objects of natural history in an intelligent and discriminating way, and to discuss the flora and faunas of different districts, but also to make important observations on the habits and languages of Indian tribes, to keep continuous meteorological records and to determine latitudes and longitudes. We accordingly find that his reports generally conclude with a series of most valuable appendices, giving special information which could not well be included in the body of the document.

In an elaborate notice of his report on the Queen Charlotte Islands, published in Petermann's Mittheilungen (Vol. 27, 1881), the writer, after calling attention to the fact that the report dealt not merely with the geology of the islands, but also with their topography, natural history, climate and ethnology, says: "One is amazed at the rich results which he brought back in all these branches, especially as he had only one assistant, Mr. Rankine Dawson, and remained in the islands only two and a half months, from the 12th of June to the end of August, and that in most unfavourably wet weather."

In addition to his field books proper, he kept copious journals which contain much interesting information. He had a habit too, of jotting down notes and sometimes verses on scraps of paper or on the backs of telegraph forms. In the wilds of British Columbia, for example, he writes:

"Contorted beds, of unknown age,
My weary limbs shall bear,
Perhaps a neat synclinal fold
At night shall be my lair.
Dips I shall take on unnamed streams,
Or where the rocks strike, follow
Along the crested mountain ridge
Or anticlinal hollow;
Or gently with the hammer stroke
The slumbering petrifaction,
That for a hundred million years
Has been debarred from action.
* * * * * * *

We can fancy him, too, sitting by his lonely camp fire on shores of the Pacific and penning the following lines:

"To rest on fragrant cedar boughs
Close by the western ocean's rim,
While in the tops of giant pines
The live-long night the sea-winds hymn,
And low upon the fretted shore
The waves beat out the evermore."

In common with British subjects in all parts of the world, he was deeply stirred by the occurrences of the South African war, and after the battle of Paardeberg (February 27th, 1900), in which his fellow countrymen played so conspicuous a part, he wrote as follows:—

"We know to-day our tale of dead,
Spent on the sun-baked windy plain,
Our best, who left us without dread,
But may not now return again.
But pride is mingled with our tears,
The seed grows to the stately tree;
We know that in the tide of years
We sow for empire yet to be.
Our loss our gain — nor sorrow felt
As rising in the east we see
The day flood all the waiting veldt.
But fathers, mothers, sisters, wives,
Your loss is more than you can bear;
For you these young, exultant lives
Gone out, in darkness everywhere.
We grieve with you, we stand to aid."

* * * * * * *

And yet his view of the war was not a wholly one-sided one, his fairness and his admiration for the Boer being evidenced by the following lines:

"The silent Boer that lies a clod,
He was a father or a son
Upon his dry, grey Transvaal sod
Among the rocks that we have won.
His narrow soul was true and strong,
To fend us from his home and kraal
He gave his life — we know him wrong,
But find him worthy after all;
And when in days to come the song
Of later harvests shall be sung
He will have part in that South land
As elder brother, true and strong.
Each spring that rises on the veldt
Will cast its wreath of self-sown flowers,
Will breathe its fragrance and be felt
About his grave as over ours.
Not all is lost if life be spent,
For it is good to truly die,
To give to that extreme extent
If so be freedom lives thereby.
The things not seen, beyond the veil,
Have harvest also full and true,
And loss we reckon but by tale
Is measured there — to each his due."

Dr. Dawson's geological work was carried on chiefly in the region of the great prairies of the Northwest and British Columbia, but he was thoroughly informed as to the geology of all parts of the Dominion. In the Northwest he paid particular attention to the relations of

the Cretaceous and Laramie formations; and he discovered the presence in the Cretaceous of Southern Alberta of an important series of rocks — the Belly River group — which, he says, "must be considered on the whole as a freshwater formation." The Kootanie group was also recognized by him as constituting a portion of the early Cretaceous in the Rocky Mountain region. His study of a large area in the interior plateau region of British Columbia established the existence there of a great series of mica-schists and gneisses supposed to be of Archæan age, and succeeded by Cambrian, Ordician, Silurian and Carboniferous strata; while in the Cordilleran region of the same province he described the occurrence of great deposits of contemporaneous volcanic rocks, in various stages of metamorphism. While working in connection with the Boundary Commission also, he studied the crystalline rocks in the Lake of the Woods district, and concluded that a considerable portion of the Huronian formation there consists of metamorphosed volcanic rocks. He was a careful student of glacial phenomena and, according to Dr. G. J. Hinde,[1] was the first to describe the glacial origin of the Missouri Coteau, and in the interior of British Columbia, he has shown that at one period of the Ice Age there was a confluent ice-mass, the surface of which stood at a level of 7,000 feet above the sea, and that it must have been at least from 2,000 to 3,000 feet in thickness. He further established the fact that the movements of the glacier ice in this region were not only to the south and southeast, and through the transverse valleys and gaps of the coast ranges to the ocean, but that it had also a northerly flow, and passed down the valleys of the Pelly and Lewes branches of the Yukon river. Dr. Dawson also maintained that the northern part of the great plains had been submerged and that their glaciation was in the main due to floating ice.

With regard to his ethnological work we cannot do better than quote from Mr. W. J. McGee's appreciative notice in the *American Anthropologist*. Mr. McGee says: "While several of Dr. Dawson's titles and the prefatory remarks in some of his papers imply that his ethnological researches were subsidiary to his geological work, and while his busy life never afforded opportunity for monographic treatment of Canada's aborigines, it is nevertheless true that he made original observations and records of standard value, that much of his work is still unique, and that his contributions, both personal and indirect, materially enlarged knowledge of our native tribes. It is well within bounds to say that in addition to his other gifts to knowledge, George M. Daw-

[1] Geol. Magazine, May, 1897.

son was one of Canada's foremost contributors to ethnology, and one of that handful of original observers whose work affords the foundation for scientific knowledge of the North American natives.

Dawson's most notable contribution to ethnology was undoubtedly his memoir on the Haida Indians of the Queen Charlotte Islands, but he also published "Notes on the Indian Tribes of the Yukon District and Adjacent Northern Portion of British Columbia," a valuable memoir entitled "Notes and Observations on the Kwakiool People of Vancouver Island," "Notes on the Shuswap People of British Columbia," and other papers.

When in 1884, the British Association appointed a committee to study the physical characters, languages and social conditions of the Northwestern tribes of Canada, Dr. Dawson was made a member, and it devolved upon him to organize and administer the work of the committee. The work was carried on for years with much success and small money expenditure, and when, in 1896, an Ethnological Survey of Canada was instituted, Dawson was chosen as the head of the survey committee.

Not the least of his services to his country were those in connection with the Behring Sea Arbitration. He was one of the commissioners, and was sent by the British Government to the North Pacific Ocean to enquire into the conditions of seal life there. Subsequently, his evidence and forcible arguments undoubtedly secured for the British side of the case a much more favourable finding than would otherwise have been obtained. Lord Alverstone (now Lord Chief Justice of England) writing of him in this connection says: "It is not possible to overrate the services which Dr. Dawson rendered us in the Behring Sea Arbitration. I consulted him throughout on many questions of difficulty and never found his judgment to fail, and he was one of the most unselfish and charming characters that I ever met. I consider it a great pleasure to have known him." In recognition of his services on the Arbitration Dr. Dawson was made a C. M. G.

He received the degree of D. Sc., from Princeton in 1887, and that of LL.D. from Queen's University in 1890, from McGill University in 1891, and from Toronto University some years later. In 1891 he was awarded the Bigsby Gold Medal by the Geological Society for his services in the cause of geology, and was also elected a Fellow of the Royal Society. In 1893, he was elected President of the Royal Society of Canada, and in 1897 was President of the Geological Section of the British Association for the Advancement of Science at the Toronto meeting. In 1897 he was awarded the gold medal of the Royal Geo-

graphical Society. In 1900, he was President of the Geological Society of America, and gave his retiring address at the Albany meeting in December, choosing as his subject "The Geological Record of the Rocky Mountain Region in Canada." This address was published as a bulletin of the Geological Society of America, and will be prized as giving a summing up of his latest views on some of the problems connected with the complex geology of the west. Many other distinctions which cannot be enumerated here fell to his lot, and he won for himself the esteem and confidence of his fellow-countrymen in all parts of the Dominion. Nowhere was he more beloved than in British Columbia — the province in which he had done so much of his best work, and in which, he sometimes said to the writer, he would like to spend his last days.

After the Toronto meeting of the British Association, in 1897, he accompanied a party of the members on a trip across the continent, and all were struck with the warmth of the welcome everywhere accorded to him. "Among the many distinguished visitors," wrote the *Victoria Colonist*, "by whose presence Victoria has been honoured during the past few days, none holds a higher or more deserved place in the esteem of Canadians than George M. Dawson. In one sense he is the discoverer of Canada, for the Geological Survey of which he has been the chief, has done more than all other agencies combined to make the potentialities of the Dominion known to the world. He has been engaged in the work so long that he can look back over it with the profound satisfaction which comes from the knowledge that his judgment on points of extreme interest and value has been justified by events. The development of Kootenay, the hydraulic mines of Cariboo, and the gold mines in the Yukon are all foretold in the interesting pages of Dr. Dawson's earlier reports. Therefore, when we find in the voluminous products of his pen, wherein the results of his observations are recorded, anticipations of great mineral development in parts of the province that are as yet unexplored, we feel almost as if such developments were guaranteed. A careful observer, a conservative reasoner, a skilful writer, Canada possesses in Dr. Dawson a public servant the value of whose services can never be over-estimated. His name carries authority with it on any subject on which he speaks. That a long career may be before him is the hope of all, for we all know how much that means to the Dominion."

Dr. Dawson was a ready and prolific writer and a brilliant conversationalist. His quiet humour was infectious, and any dinner party which numbered him among the guests was sure to be a merry one.

He seemed to have an inexhaustible fund of information, not merely about his own special lines of work, but covering the widest range of subjects. The marvel was how in his busy life he had acquired so much and such varied knowledge. For one of apparently delicate constitution, his powers of enduring prolonged physical exertion were as remarkable as his capacity for continuous mental activity. He was at work at his office until two days before his death, the immediate cause of which was capillary bronchitis. The secret of Dr. Dawson's widespread popularity, no doubt, lay in his downright unselfishness and in his sunny and sympathetic nature.

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